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DATAMATION

FOR MANAGERS OF INFORMATION TECHNOLOGY WORLDWIDE

SEPTEMBER 1, 1991

Glover T. Ferguson Jr., product executive, Andersen Consulting, with the Foundation For Cooperative Processing CASE tool

A CASE For Client/Server

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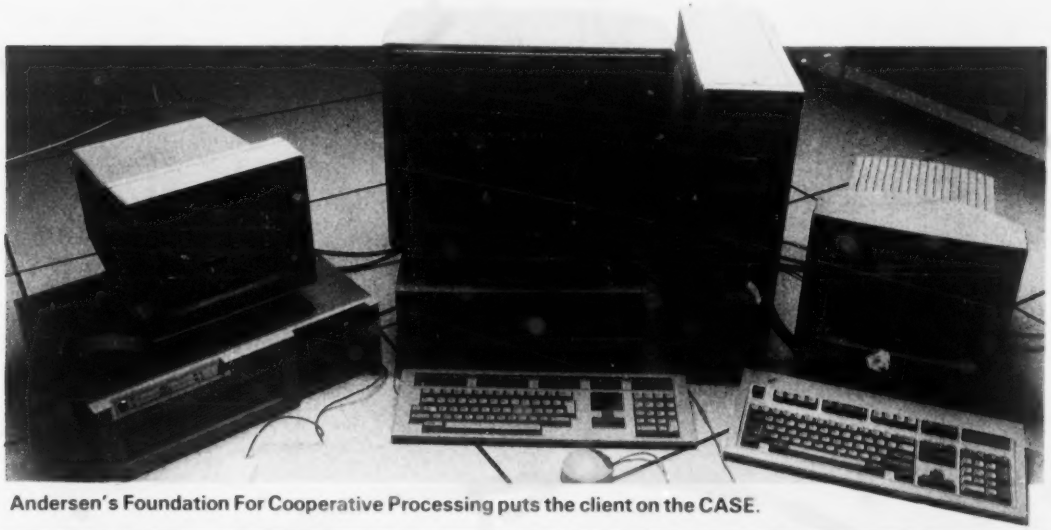

Andersen's Foundation For Cooperative Processing puts the client on the CASE.

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BY MIKE RICCIUTI Andersen's Foundation For Cooperative Processing CASE product does what other CASE vendors only promise: designs and generates code for client/server applications.

Cover photography by Andy Goodwin

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BY BOB FRANCIS Super chips at super prices are making 3-D workstations surprisingly affordable. Software interoperability remains a problem, but at these prices who wants a plain old workstation anymore?

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BY PAUL PINELLA PCs and LANs have won the war as the de facto choice for many client/server applications. But, until the market matures, users must mix and match tools from among the scores that are now available.

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BY NED SNELL Long used for application development, methodologies are now being pushed for integration projects. But how well matched is the ordered world of methodologies to the anything-can-happen world of integration?

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BY JEFF MOAD After years of wrangling over specs for a proprietary CIM environment, Sematech has scrapped its plans in favor of standards-based computer-integrated manufacturing.

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Mixed Year For Asia's IT Industry

BY MARSHA W. JOHNSTON

A variety of economic factors made it a tougher year than usual for some Asian hardware vendors. But demand for software—all over the Far East—is heating up.

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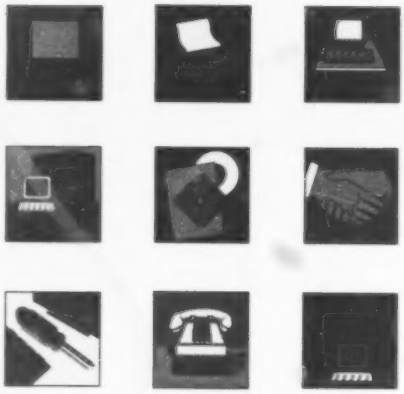

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PC Software Giants Move Into E-Mail

Now that Lotus and Microsoft are in the e-mail business, users can expect tighter integration of typical PC applications with messaging.

BY TOM McCUSKER

Early this spring, within a month of each other, software giants Lotus Development Corp. and Microsoft Corp. each gobbled up a vendor of electronic mail. Both said the move would strengthen their position in the groupware market. For users, the entrance of two PC application software heavies into e-mail bodes well for the further integration of messaging into networked desktop computing.

The companies are entering one of the hottest software arenas in commercial computing. LAN mailboxes, which only accounted for 26% of all e-mail boxes in 1990, is projected to skyrocket to 39% by 1994, says Ann Palermo, director of office systems research at International Data Corp. in Framingham, Mass.

Microsoft bought the assets of Consumer Software Inc., of Vancouver, British Columbia, Canada. Included in the deal was Consumer Software's PC-based e-mail service, called The Network Courier, which Microsoft wanted to complement its Microsoft Mail For AppleTalk Networks. Shortly after the acquisition was completed, the Redmond, Wash.-based PC software giant upgraded and renamed Network Courier as version 2.1 of Microsoft Mail For PC Networks. Microsoft says the product works on all major PC networks and desktop environments, including its Windows graphical environment.

Lotus Enters The E-Maelstrom

Microsoft's acquisition followed Lotus's March 1991 purchase of cc:Mail Inc. of Mountain View, Calif. Lotus's motive: it simply wanted to be in the e-mail business. "With this acquisition, Lotus establishes itself as the leading vendor in LAN-based communications software," says Jim Manzi, the Cambridge, Mass.-based company's president and chief executive officer.

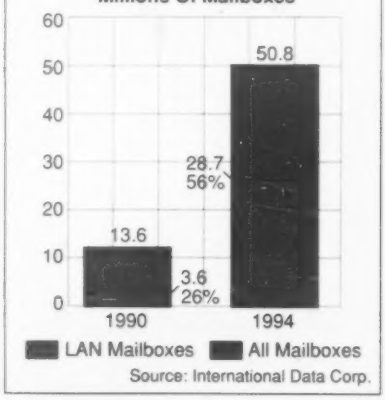
Cc:Mail has captured 35% of the LAN e-mail market, and Lotus envisions cc:Mail as an avenue through which to sell its widely acclaimed three-year-old Notes group communications product (see "IS Puts Notes To The Test," August 1, 1991, p. 24). It thus is integrating the underlying architectures of cc:Mail and Notes. Lotus sells its Notes product with built-in e-mail. But, under the integration scheme, there will be a common Lotus messaging architecture, says Shelley Harrison, director of marketing at cc:Mail, which now operates as a division of Lotus.

Lotus also announced an agreement in June with IBM to integrate both cc:Mail and Notes with IBM's OfficeVision suite of office automation software. OfficeVision/2, the version for PCs running the OS/2 operating system, will share a common messaging engine with the two Lotus programs. This would spare OfficeVision/2 users of Notes from having to use multiple e-mail systems, as well as give them the ability to use Notes's groupware functions.

IDC's Palermo says the deal is significant in two respects. First, agreement among Lotus, cc:Mail and IBM to use a common directory and mail engine puts the status of Novell Inc.'s Message Handling System as an emerging de facto standard in question. MHS could be further weakened if Microsoft decides to push a third standard. Second, the Notes/OfficeVision connection means that developers will be able to write OV applications that include unstructured information. And they'll be able to write to the Notes back-end database manager without using Notes's interface.

LAN E-Mail Is Growing More Than 50% Yearly

The number of LAN mailboxes is expected to increase at a compound annual rate of 68% until 1994, when most mailboxes will be on LANs.



Source: International Data Corp.

Microsoft's Mail Moves

Microsoft says it expects to begin shipping a Microsoft Mail connection this month that will link Microsoft Mail For AppleTalk Networks and Microsoft Mail For PC Networks. Previously, the two products were incompatible. Mail For AppleTalk is a client/server product, whereas the Network Courier was a file-based system. Microsoft product manager Kathleen Schoenfelder says the connection will enable users on both mail systems to exchange directories, messages and files seamlessly.

Microsoft's next move is to exploit the messaging transport function of e-mail. Schoenfelder likens the messaging transport to a layer on the network in the way that a network operating system is a layer. Microsoft already has an extensive application programming interface for the Macintosh called the Mail API (MAPI).

A more limited API—the File Format API (FEAPI)—exists for PCs, but Microsoft will release a PC version of MAPI in the near future.

Microsoft's own applications will probably be mail-enabled in the next upgrade after MAPI is released, says Schoenfelder. That might, for example, take the form of including Open Mail and Send Mail commands within word-processing or spreadsheet applications.

"We are also creating other work group applications that ride on top of the e-mail network," she adds. These include calendar and scheduling applications that already have been released on Microsoft's AppleTalk system. "Free-standing applications, such as Lotus 1-2-3, Excel and Word, as well as any kind of work group application written specifically for networking environments, will be able to tap into the network's e-mail transport system," she adds.

"Nineteen ninety-two will be a very interesting year in the e-mail industry," concludes Schoenfelder, as e-mail and other networked applications begin to act synergistically. ▭

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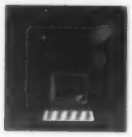


Mixed Year For Asia's IT Industry

A variety of economic factors made it a tougher year than usual for some Asian hardware vendors. But the demand for software—all over the Far East—is heating up.

BY MARSHA W. JOHNSTON

Far East investment growth in information technology isn't racing ahead on high-speed rails. But a variety of factors, including the Japanese labor shortage, government initiatives in Korea, a new Taiwanese PC OEM business and voracious industrialization in Southeast Asia should keep the engine of investment in IT chugging along nicely in the coming months.

This is not to say potential roadblocks to growth in the industry don't exist. Once-brisk capital spending could be further dampened in Japan, due to a confluence of factors. Those factors include high interest rates, falling real estate prices, weak stock market performance and a tightening money supply.

Roadblocks in Korea and Taiwan include continuing appreciation of the won and the New Taiwan dollar, along with rising wages and inflation. In Korea, continuing political unrest could stand in the way of business growth in general. And none of this takes into account the continued U.S. recession or the slump in the worldwide computer industry.

Where The Growth Is

The fastest growth in Asia lies in the PC and peripherals sectors.

RANK	COMPANY	PC REVENUE 1990	1989	% CHANGE
1	Daewoo	121.7	87.2	39.6%
2	Ricoh	373.0	287.5	29.7%
3	Acer	488.0	377.8	29.2%
4	Mitac	229.5	178.6	28.5%

RANK	COMPANY	PERIPHERALS REVENUE 1990	1989	% CHANGE
1	Daewoo	16.2	11.1	46.0%
2	Acer	118.0	92.3*	27.8%
3	Ricoh	559.5	438.7	27.6%

All revenue figures are in $ millions, based on fiscal year results.
* Restated figure

Japan: Sun Rises On Software

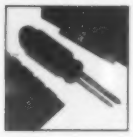
A recent report issued by Japan's Ministry of International Trade and Industry (MITI) estimated that total capital spending in Japan will rise only 9.2% in fiscal year 1991 (ending March 1992), the first time in four years that capital spending growth will be less than 10% and far below FY90's 17.5% rate.

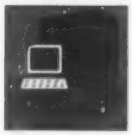
Few figures are available to indicate the percentage of total private-sector capital expenditure devoted to IT. But Takatoshi Yamamoto, senior analyst at Morgan Stanley in Tokyo, says it probably registered at 11% for FY90, down about 1% from FY89.

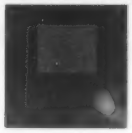
This fiscal year, overall spending on IT in Japan should grow slightly, analysts say, as Japanese corporations automate to mitigate the negative effects of a severe labor shortage. MITI's report says that almost three-quarters of the 1,521 Japanese firms surveyed view the shortage as a "serious structural problem," which will cause them to "continue to invest strongly in energy-saving and streamlining measures."

Junichi Saeki, research manager for Dataquest Japan Ltd.'s research group, and Alan Bell, deputy head of research for Baring Securities Ltd. in Tokyo, agree that this trend should increase spending on computers and networks slightly this year. "Spending on IT systems will be moderately positive...flat to plus four [percent]," says Bell.

According to estimates from analysts and MITI, much of that growth will come from PCs, software, systems integration and local area networks; little will be derived from large systems. Over the next five years, hardware growth potential should be only about 1 to 2% for mainframes, but in the double digits for PCs and smaller products, says







Morgan Stanley's Yamamoto. His estimates are backed up by one Digital Equipment Corp. Japan executive, who says sadly, "Things have been slow. People have been putting off making $1- to $2-million purchases."

One reason for the flat growth in large systems is high interest rates. High borrowing costs, combined with a tightening money supply, could be the biggest inhibition to corporate spending on IT, say analysts, particularly if these factors are combined with low business confidence.

The average interest rate on bank loans rose to 7.68% in March 1991 from 6.21% in February 1990. In June, the Bank of Japan's (BOJ) quarterly survey of companies, the Tankan, showed the economy slowing and business confidence declining. On July 1, the Bank of Japan responded to a call for lower interest rates by cutting the discount rate—the rate the BOJ charges its member banks—half a percent to 5.5%, still a quarter percentage point higher than it had been the previous year.

Economic analyst Douglas Ostrom of the Japan Economic Institute in Washington, D.C., says the cut was not enough to spur demand. Furthermore, Ostrom says, banks are lending more cautiously as they gear up to meet new worldwide lending regulations that will come into effect in March 1993. And lenders have also grown more cautious in the face of Japan's overvalued real estate market.

The tightening money supply does not seem to have affected investments in software, which generally comes with much lower price tags than do large-scale systems. In fact, customers from all over Asia, including Japan, are buying software voraciously. MITI forecasts 15 to 16% growth for the software market for FY91, including packaged and custom-developed software. In addition, spending on LANs is up dramatically, says Baring's Bell, who says it grew 30% in FY90. He estimates it will increase by the same percentage in FY91.

Companies buying software need help implementing it and linking a wide variety of systems and software together—creating a significant need for professionals with systems integration expertise. Vendors are only too happy to comply. Some systems integrators, such as Arthur Andersen, have been working in Japan for a few years, but between 1989 and 1990 there was a surge of systems integrators entering the market. In that period, says Dataquest's Saeki, about 100 companies, mostly Japanese software developers, declared themselves system integrators. This May, General Motors Corp.'s giant systems integrator/outsourcing company Electronic Data Systems Corp. joined the fray.

As Japanese businesses begin to move away

The DATAMATION Asian 25

	1989 ASIAN RANK	1990 WORLD RANK	COMPANY	1990 IS REVENUE	1989 IS REVENUE	% CHANGE***	1990 TOTAL REVENUE	IS AS % OF TOTAL REVENUE	NET EARNINGS	FISCAL YEAR
1	1	3	Fujitsu**	14,196.2	12,245.8*	15.93%	20,521.1	69.18%	571.1	March
2	2	4	NEC	13,407.5	12,733.5*	5.29%	25,544.2	52.49%	375.6	March
3	3	5	Hitachi	9,604.1	8,961.2*	7.17%	53,432.1	17.97%	1,589.7	March
4	4	13	Toshiba	5,169.2	4,842.9*	6.74%	22,444.8	23.03%	759.7	March
5	6	15	Matsushita	4,101.8	3,915.6*	4.75%	45,575.3	9.00%	1,788.1	March
6	5	14	Canon	4,040.1*	3,390.0*	19.18%	11,933.3	33.86%	424.1	December
7	7	27	NTT Data	2,382.0	2,218.5*	7.37%	2,382.0	100.00%	87.7	March
8	11	34	Ricoh	2,331.3	1,862.1*	25.20%	6,928.6	33.65%	93.6	March
9	8	25	Nihon Unisys	2,241.4	2,071.8*	8.19%	2,241.4	100.00%	13.9	March
10	10	29	Oki	2,086.8	2,087.3*	-0.02%	4,564.4	45.72%	68.1	March
11	9	28	Mitsubishi	1,830.1	1,662.6*	10.07%	22,902.2	7.99%	550.8	March
12	13	39	C. Itoh	1,595.1	1,345.9	18.52%	145,011.5	1.10%	242.6	March
13	12	40	Seiko Epson	1,590.7	1,449.5	9.74%	2,913.4	54.60%	N/A	December
14	15	64	Acer	751.0	551.1*	36.27%	949.0	79.14%	2.4	December
15	20	113	Nomura	652.3	675.2*	-3.40%	963.5	67.70%	51.6	March
16	N/A	68	Tatung	593.4	580.0	2.30%	1,877.9	31.60%	11.0	December
17	14	76	CSK	527.2	495.1*	6.49%	553.9	95.18%	32.8	September
18	19	101	Sony	499.5	417.4*	19.66%	24,975.9	2.00%	807.5	March
19	18	94	Kyocera	480.0	482.9*	-0.61%	3,185.3	15.07%	222.7	March
20	17	91	Mitac	450.0*	380.0	18.42%	450.0	100.00%	23.2	December
21	21	107	Intec	402.7	356.9	12.84%	402.7	100.00%	16.5	March
22	N/A	N/A	Goldstar	391.0	365.3	7.04%	4,216.1	9.27%	47.5	March
23	16	98	Alps	384.1	398.7	-3.64%	3,190.6	12.04%	57.0	March
24	N/A	N/A	Omron	291.3	265.4	9.78%	3,207.0	9.08%	148.3	March
25	22	156	Daewoo	200.2	195.6	2.38%	298.1	67.16%	4.8	December

Figures are in $ millions.
World rank based on CALENDAR YEAR 1990; Asian rank based on individual company's fiscal year.

N/A = Not available
*Restated figure
**Fujitsu includes 80% of four months of ICL's revenues.
***Revenue growth figured on a dollar basis in the table, but on the basis of native currency in the profiles.

from their traditional tendency toward centralization, Japanese users are buying more notebook computers than are their foreign counterparts. Indeed, Toshiba Corp. says its notebooks accounted for 70% of its domestic laptop sales in FY90 but only 48% of its laptop sales outside Japan. Indeed, analyst Bell says, notebooks are having as much or more of an impact on the Japanese market as laptops did when they were first introduced.

Korea: Government Pushes IT

In FY90, South Korean purchasers bought $1.7 billion worth of IT equipment, a whopping 31% more than they did the year before. Much of that investment came from the country's huge family-run conglomerates, or chaebols, which dominate Korean industry. With mammoth corporate populations and projects to support, chaebols buy a lot of mainframes and midrange systems. "It's a high-end market because of Korea's large companies," says Joseph B. C. Sweeney, regional production manager for ResearchAsia Ltd. in Hong Kong.

One factor promoting such rapid growth is strong government support for IT investments. South Korea has an ambitious strategy to computerize not only the chaebols but smaller businesses, schools and the military.

Among the Korean government's several IT projects is its three-year-old Five Network Plan, which intends to create national networks for a variety of industries. In the next seven years, for instance, the government plans to install millions of PCs into schools as part of a monolithic educational network.

And Korea is not only implementing systems and networks, it's making research and development efforts, as well. For instance, the government will soon complete development of Ticom, a prototype of a UNIX-based minicomputer with Korean-language capability. South Korean administrators expect the chaebols to use the prototype to create marketable products. But such a project may prove too difficult even for Korea's largest computer makers.

Although about four of the chaebols have publicly stated they will follow through on their Ticom commitment, in general, the chaebols have doubts about the project's worth, says ResearchAsia's Sweeney. No chaebol will buy from another, he maintains, and thus a company's Ticom market would be limited to itself and its associated companies. The overseas market, already crowded with UNIX mini makers, won't be fertile ground for Ticom, either. Furthermore, says Sweeney, "I don't think they [the chaebols] have the right skills to sell that product overseas, and I don't think they think they have the right skills."

The DATAMATION Asian 25 By Technology

	COMPANY	1990 IS REVENUE	MAIN-FRAME	MID-RANGE	PCs	WORK-STATIONS	SOFT-WARE	PERI-PHERALS	DATA-COM	SERVICES	MAINTE-NANCE	OTHER
1	Fujitsu*	14,196.2	3,691.0	1,419.6	1,419.6	142.0	2,129.4	2,129.4	283.9	1,135.7	993.7	851.8
2	NEC	13,407.5	2,815.6	1,743.0	3,620.0	134.1	1,340.7	1,877.0	268.1	402.2	536.3	670.4
3	Hitachi	9,604.1	3,418.5	398.6	718.4	192.1	798.1	2,831.5	386.7	259.3	244.3	356.6
4	Toshiba	5,169.2		1,125.7	2,488.3	216.2		727.2	207.2			404.7
5	Matsushita	4,101.8			164.1	902.4		1,763.8	1,025.4		246.1	
6	Canon	4,040.1			426.8			2,399.8		963.7		249.7
7	NTT Data	2,382.0							1,429.2	952.8		
8	Ricoh	2,331.3			373.0		116.6	559.5	1,049.1		116.6	116.6
9	Nihon Unisys	2,241.4	872.0	125.6	118.0	82.3	541.3				252.6	249.6
10	Oki	2,086.8		83.5	93.9		156.5	1,210.4	354.8		187.8	
11	Mitsubishi	1,830.1	146.4	420.9	201.3			603.9	457.5			
12	C. Itoh	1,595.1				558.3	111.7	733.8	63.8	127.6		
13	Seiko Epson	1,590.7			636.3			954.4				
14	Acer	751.0			488.0	135.0		118.0			10.0	
15	Nomura	652.3								652.3		
16	Tatung	593.4			150.2			300.5	142.7			
17	CSK	527.2		96.7			430.5					
18	Sony	499.5				75.0		424.5				
19	Kyocera	480.0			51.8			276.2	151.9			
20	Mitac	450.0	13.5	9.0	229.5	9.0	4.5	148.5	13.5	18.0	4.5	
21	Intec	402.7					154.8		54.1	111.5		82.3
22	Goldstar	391.0		39.1	195.5			156.4				
23	Alps	384.1						384.1				
24	Omron	291.3			167.9	36.7		86.8				
25	Daewoo	200.2	8.8		121.7	14.5	30.7	16.2	4.0	0.6	3.5	0.3

Revenue figures are in $ millions for fiscal 1990.
*Fujitsu includes 80% of four months of ICL's revenues.
Technology segment totals may not add up to total revenue due to rounding.

But Korean companies can successfully sell PCs overseas, particularly into newly developing parts of Asia like Indonesia. For the most part, Korean firms such as Goldstar Co. Ltd. assemble PCs in Indonesia and then sell them under Indonesian brand names, maintains Sweeney.

Tough Times For Taiwan

Taiwan's IT industry has historically concentrated on low-margin, low-end products for export; more than 90% of Taiwanese-made electronics products were exported last year. This strategy worked to Taiwan's detriment in 1990, as a worldwide crunch in PC prices and a strong New Taiwan dollar combined with the country's rising labor costs and inflation rates to severely undercut the profitability of Taiwanese IT vendors. Acer Inc., Taiwan's largest IT company, suffered a 59% drop in profits.

Foreign Exchange

Values of foreign currency (equivalent to one dollar) used in this year's DTM 100*.

JAPAN	¥144.8
SOUTH KOREA	W707.76
TAIWAN	NT$26.63

*OECD average exchange rates

"There are very few Taiwanese companies adding value to their products. They have always survived on relatively low margins, so where U.S. and European companies have had to drop their margins significantly, Taiwanese companies didn't have much profit margin to drop," says David Hoffman, technology practice manager at Investec (Taiwan) Ltd., a marketing consultancy.

These problems have caused an incredible consolidation of PC dealers in Taiwan. Dealerships in the island nation now number 600, down from 2,000 two years ago, Hoffman reports. Increasingly, the savvy surviving dealers are selling software along with hardware and realizing higher revenues as the prices of such value-added bundled systems climb. Revenues are increasing drastically, Hoffman maintains, despite the fact that unit sales have declined.

Most of these dealers are adding value with little help from vendors. For instance, Hoffman says, most manufacturers have failed to recognize the fact that Taiwanese dealers "are just learning how to integrate applications and consult end users on what they want to buy." Apple Computer, he says, is the only major exception among the vendor community; the Macintosh marketer is actively training Taiwanese dealers to add value.

Manufacturers are, however, responding to lower profit margins by attempting to market more advanced workstations and laptop computers, which have the potential to garner higher profit margins. A report by the Market Intelligence Center of the Institute of Information Industry, a government-sponsored market research agency, states that by 1990 about 200 Taiwanese firms had started to manufacture portable PCs.

One piece of good news for Taiwanese PC makers: Investec reports an influx of first-time original equipment manufacturer (OEM) business from companies like NCR Corp., which are buying Taiwanese computers and reselling them under their own brand names.

Southeast Asia: Engine Of Growth

Heavy investment in software, services and communications is one factor fueling the rapid growth of the IT industry in Southeast Asia. "People here are beginning to realize that software and services are more important than hardware, so we're seeing a boom in [those] sales," says ResearchAsia's Sweeney. In Indonesia, which ResearchAsia says is the fastest growing Asian market for IT, 1991 revenue growth in software and services is projected at about 46%. ResearchAsia predicts hardware revenues will grow at about 27% in 1991.

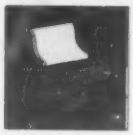
But that's from a small base of installed information technology equipment—particularly software, says Sweeney. As software installations catch up to hardware implementations over the next five years, he says, the rate of growth in software and services will slow to that of hardware.

The stars of hardware growth in the region, as elsewhere in the world, are workstations and PCs. Strong growth in workstations in most countries is likewise due in large part to a small installed base in countries like Indonesia. And Sweeney is not confident that this trend will continue. "I believe this very quickly will peter out, however, because Indonesia, like Thailand, has a very strong agricultural industry, and workstations tend to be sold into economies with strong manufacturing bases," he says.

As purchasers snap up PCs and workstations, particularly in developing countries like Malaysia and Thailand, they are also choosing PC LANs. But most users there don't understand how to get a PC LAN to work. "Many software houses don't know how to tune a LAN. [They] say, 'We can put in a LAN, and your PCs will run better,' so the user thinks the programs will run faster and the PCs will share data, but it doesn't happen," says Sweeney. Consequently, there is a huge, unfilled market for LAN specialists in Southeast Asia.

"Huge" is also a good way to describe the market for telecommunications in the region. In August, the Thai government awarded a deal worth between $2.4 billion and $2.86 billion to the local Charoen Pokphand Group to install 2 million new telephone lines in the Bangkok area.

Obviously, says Sweeney, Southeast Asia is no longer just a cheap labor market, but "has gotten to be a rich area of the world and a complex and sophisticated IT market."



FUJITSU LTD.

6-1 MARUNOUCHI 1-CHOME
CHIYODA-KU, TOKYO 100, JAPAN
(81-3)-216-3211

RANK 1

IS REVENUE $14.20 B

The bad news for Asia's largest vendor of information technology was that, as 1990 wore on, rising interest rates at home and a worldwide recession combined to depress demand and put pressure on earnings. The good news was that, unlike IBM and other major competitors, Fujitsu Ltd. in 1990 still had plenty of room to grow in major European and North American markets. Last year, Fujitsu cashed in on that growth opportunity by acquiring 80% of International Computers Ltd., a $2.7 billion U.K.-based mainframe vendor and long-time Fujitsu partner.

The ICL acquisition helped boost Fujitsu's total sales in fiscal 1990, which ended March 1991, by 16.5% to ¥2.97 trillion ($20.5 billion). The computer and data-processing equipment product set—which spans supercomputers to PCs—was the company's fastest growing segment. Its revenues in yen terms increased 21.7% to ¥2.06 trillion ($14.2 billion), or 69% of Fujitsu's revenue.

Despite revenue growth in many sectors of the company, intense international competition and a strengthened yen combined to drive down Fujitsu's net earnings by 4.7% to ¥82.7 billion ($571.1 million). Fujitsu officials say they expect continued slow economic growth worldwide to keep a lid on sales in fiscal 1991.

In the face of sluggish sales in existing markets, Fujitsu is continuing the push to expand internationally. The ICL acquisition helped increase Fujitsu's overseas business about 2% to 24.8% of the company's total 1990 revenue. Fujitsu officials predict overseas sales will jump to 40% of the company's revenue in FY91, when ICL results will be included in Fujitsu's financial statement for the full year. (Since the Fujitsu/ICL deal took place on December 1, 1990, Fujitsu included in its FY90 results 80% of ICL's income from December to March 31, 1991.)

Tough economic conditions didn't keep the company from launching several key products in 1990. Fujitsu introduced a high-end extension to its M-series Facom mainframe line. The new M-1800 group competes with IBM's ES/9000 class of mainframes.

Fujitsu also unveiled several enhancements to its VP 2000 series of supercomputers. The largest, the VP2400/40, will begin to be shipped this month.

Less successful were Fujitsu's ongoing efforts to become a force in personal computer sales in Japan. Although the company continued to enhance its two-year-old FM Towns line of DOS-compatible PCs, the company failed to gain market share. In 1990, Fujitsu held 13.7% of the Japanese PC market, according to the *Japan Industrial Daily*, about the same as it held the year before, when it introduced FM Towns. That figure was far behind NEC Corp.'s leading 50% share.—*Jeff Moad*

NEC CORP.

5-7-1 SHIBA 5-CHOME
MINATO-KU
TOKYO 108-01, JAPAN
(81-3)-3798-6511

RANK 2

IS REVENUE $13.41 B

This was a year of innovation and expansion for NEC Corp. The ¥3.7 trillion ($25.5 billion) company made significant mainframe and personal computer product announcements and broadened its European marketing efforts.

Innovation has apparently paid off for NEC: IS revenues climbed almost 11% to ¥1.9 trillion ($13.4 billion) in fiscal year 1991. Employment is up, too. In a year when most computer companies cut their work forces, NEC added another 2,000 employees.

Net earnings, however, suffered a drop of 36% to ¥54 billion ($375.6 million) due largely to losses incurred from the company's withdrawal from the audio-visual business in the United States, weakened business performance in semiconductor subsidiaries and lower earnings from affiliated companies.

In July of 1990, NEC announced what it billed as the "world's fastest mainframe computer." However, that title didn't last long for the 500-million-instruction-per-second ACOS 3800. NEC outdid itself with the March 1991 announcement of the ACOS 3900, which clocked speeds of up to 700MIPS. The company expects to sell more than 200 of the ACOS machines by 1995, but analysts doubt the systems can boost NEC's market share, as they are not IBM compatible. NEC has approximately 2% of the high-end U.S. mainframe market and 8% of that sector in Japan.

The company's creativity extended from the most powerful mainframes down to the most miniature of its systems. The company announced in Japan this year its Handy98, a 1.1-kilogram (2.4-pound) computer. The 10-megahertz system is about half the size of other notebook computers and comes bundled with Microsoft Corp.'s MS-Works software. The company also announced a color notebook in its 9800 series, priced at ¥650,000 ($4,460), about half the price of most color notebooks. Finally, with an eye on the growing number of telecommuters in Japan, the company added a radio frequency modem to its traveling notebook. NEC now has more than 25 models in its 9800 line of personal computers and about half of the market in Japan.

Preparing for the local area network market to boom in Japan as it has in the United States, NEC joined forces with Mitsubishi Corp. and Otsuka Shokai, NEC's largest Japanese distributor, to form Networld, a distributor of LAN-related products. NEC also gave away its Japanese version of Microsoft's Windows 3.0 to developers. That move was intended to counter an IBM-led consortium of seven companies developing competing PCs based on an open standard for the Japanese market.—*Tom Wood*

HITACHI LTD.

6 KANDA-SURUGADAI 4-CHOME
CHIYODA-KU, TOKYO 101, JAPAN
(81-3)-3258-1111

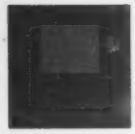
RANK 3

IS REVENUE $9.60 B

Hitachi Ltd. is a company that has to think smaller in order to grow. The company's traditional strengths in the supercomputer, mainframe and workstation markets helped boost its information technology revenues an estimated 12.5% to ¥1.39 trillion ($9.6 billion) in fiscal 1990, which ended in March of 1991. But Hitachi remains an also-ran in fields such as systems integration, PCs and notebook computers—the major growth areas in the Japanese computer industry.

In June 1990, Hitachi introduced its M-880 mainframes, which it claimed at the time were the world's fastest. Breaking old habits, Hitachi announced its entry into the new generation of mainframes before rivals Amdahl Corp., Fujitsu Ltd. and IBM, underscoring how the company has jettisoned its "follower" role. Analysts don't expect IBM's dominance of the market to change overnight, but the M-880 series marks the beginning of a long-term assault on Big Blue. In fact, Hitachi Data Systems Corp., a mainframe distributor set up two years ago by the Japanese firm and Electronic Data Systems Corp., grew during 1990 on the strength of Hitachi's fast new mainframes.

Hitachi remains strong in the midrange section of the computer market. The company has an 80% share of the market in stockbrokers' dealing stations in banks and securities firms in Japan, and customer loyalty



should ensure its continued dominance in this sector. However, analysts note that Hitachi is weak when it comes to designing engineering workstations.

"Hitachi is putting more effort into designing workstations," says Junichi Saeki, research manager of Dataquest Japan's information systems group. Saeki adds that the firm has a wealth of in-house software design experience and hence an impressive potential for software development. Meanwhile, following up its July 1989 agreement with Hewlett-Packard Co. to codevelop reduced instruction set computing (RISC) chips for workstations, Hitachi recently announced that the two firms will introduce a 32-bit workstation by early 1992.

This past May, Hitachi made two attempts to increase its profile in the PC market, with the 32-bit Flora PC and the With Me word processor. The With Me machine is reported to be selling well, although Hitachi has yet to release official sales data for the two new products. Hitachi and HP are jointly developing a new workstation that will incorporate a microprocessor operating at 100 million instructions per second (MIPS). Hitachi is expected to unveil the workstation late this year or early next year.

In February 1991, Hitachi set up Hitachi Computer Products Europe SA, a manufacturing company in Orleans, France, in anticipation of the European Community's 1993 market integration. Production of magnetic disk drive systems and control equipment is set to get under way in May of 1992. Hitachi expects the 170-person company to rack up Fr550 million ($101 million) in 1992.—*Steve McClure*

TOSHIBA CORP.

1-1- SHIBAURA 1-CHOME
MINATO-KU, TOKYO 105-01, JAPAN
(81-3)-3457-2104

RANK 4
IS REVENUE $5.17 B

Despite thinner profit margins on personal computers and semiconductors, Toshiba Corp. displayed an aggressive attitude toward new product development, new marketing relationships and plant expansion in 1990 and into 1991.

As a result, the company's information systems revenues reached nearly ¥749 billion ($5.17 billion) in the 12-month period ending March 31, 1991. The figure represents a 12% gain from Toshiba's previous fiscal year. Overall corporate revenues for Toshiba increased 6% in FY90 to ¥3.25 trillion ($22.4 billion).

Price cutting in PCs and in 1-megabit dynamic random access memory (DRAM) semiconductors took their toll on Toshiba's profits, which fell almost 50% during the fiscal year. An increase in interest and other income, however, salvaged the company's bottom line: net earnings rose 13.6% to ¥110 billion ($760 million).

Marketing battles in personal computers have been fiercest in the U.S. In response to market conditions, Toshiba slashed PC prices as much as 33% earlier this year, and it scaled back PC production plans in the United States.

However, the heat of such battles didn't keep Toshiba from introducing new IS products. In November 1990, the company unveiled three notebook PCs based on Intel Corp.'s 80386SX chip and a new laptop PC.

Toshiba also introduced reduced instruction set computing (RISC) into its laptop line. In May 1990, the company unveiled the SPARC LT, a 17.7-pound portable engineering workstation operating at 13 million instructions per second (MIPS). Possibly because of its ¥2 million ($13,812) price tag, Toshiba sold only 2,300 of the units in its first year on the market—far below the 12,000 models it expected.

In June 1991, the firm introduced a voice/data private branch exchange (PBX) in the United States and started shipping, through a joint venture, local area network operating systems software in Japan.

—*Marsha W. Johnston*

MATSUSHITA ELECTRIC INDUSTRIAL CO. LTD.

1006 OAZAKADOMA
KADOMA-SHI, OSAKA-FU 571, JAPAN
(81-6)-908-1121

RANK 5
IS REVENUE $4.10 B

Consumer electronics giant Matsushita Electric Industrial Co. Ltd., spent 1990 continuing its efforts to squeeze into the small systems computer market. The company abandoned its mainframe-manufacturing effort in 1964 and only reentered the commercial market in the last few years. As a relative latecomer to IS, Matsushita has chosen to enter markets quickly through joint ventures. So far, the strategy appears to be successful. Matsushita can offer partners its worldwide sales and marketing resources using the Panasonic and National brand names, among others.

Last year, Matsushita signed agreements with two worldwide computer firms. In a deal signed with Mountain View, Calif.-based Sun Microsystems Inc., Matsushita gained marketing rights to Sun's workstations in exchange for access to that company's UNIX operating system and Scalable Processor Architecture (SPARC) chips. Another agreement signed with Munich-based Siemens Nixdorf Informationssysteme AG granted Matsushita the right to sell SNI's desktop computers in Japan, with SNI selling Matsushita's laptops in Europe under the Panasonic label.

In late 1989, Matsushita signed similar agreements in the U.S. market with PC maker Tandy Corp. and Sequent Computer Systems Inc. Under the Tandy agreement, Tandy manufactures both 16- and 32-bit desktop PCs for Matsushita for sale under the Panasonic label. Similarly, 8-bit laptops that are manufactured by Panasonic in Japan are sold in the United States under both the Panasonic and Tandy labels. Meanwhile, the agreement with Sequent allows Matsushita to sell Sequent's line of superminicomputers in Japan.

Despite Matsushita's overseas ventures, the domestic Japanese market remains critical to the company's success. About 55% of sales are made in Japan. The company has been successful in diversifying its market focus from consumer to business sales, however. Today about half of its sales are to business users.

All of Matsushita's IS business is found within the company's Communication and Industrial Equipment division. This division, the second largest and fastest growing division in the company, includes office automation equipment, communications equipment and a wide variety of industrial systems. In the fiscal year ending March 1991, division sales reached ¥1.533 trillion (about $11 billion)—an increase of 13% over the previous year's level. DATAMATION estimates that almost 40% ($4.1 billion) of this division is IS. The company as a whole showed a revenue increase of almost 10%.

—*Johan Hallsenius*

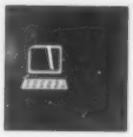
CANON INC.

DAI-ICHI SEIMEI BUILDING
7-1 NISHI SHINJUKU 2-CHOME
SHINJUKU-KU, TOKYO 163, JAPAN
(81-3)-3348-2121

RANK 6
IS REVENUE $4.04 B

Office equipment maker Canon Inc. continued its thrust into the computer business last year. The company, which analysts say controls over 70% of the world's laser printer market, ramped up production of its Bubble Jet printer line last year. Among Canon's many original equipment manufacturer (OEM) customers is Apple Computer Inc., which snapped up the printers for its Macintosh family.

Canon intends to focus more on IS for the



rest of the decade, both through its own efforts and through joint partnership arrangements. Early this year, the company signed a dealership agreement with Cray Research Inc. to market Cray's entry-level Y-MP2E supercomputer.

In the coming months, the company expects its $100 million investment in Steve Jobs's Next Inc. finally to pay off. Canon expects sales of NeXTcube workstations, which it has marketed exclusively in Japan since 1989, to increase 10-fold. That projected jump is due to the fact that users who once had only English-language software now will have workstations that sport a Japanese network operating environment. Nevertheless, Tom Murtha, an analyst for Baring Securities Inc. in Tokyo, remains skeptical. "It will still be uphill, even with Japanese language support, because Next is seen as being an unproven player."

For the long term, Canon's strong suit will continue to be digital-imaging technology. Late last year, the company introduced a plain paper facsimile machine ready to accommodate Nippon Telegraph and Telephone Co.'s Integrated Services Digital Network (ISDN) service. According to Murtha, Canon is also the leading contender to develop and commercialize a cost-effective color desktop printer in the early 1990s.

Canon's total revenues rose a healthy 28% to ¥1.73 trillion ($11.9 billion) in 1990. IS revenues rose 25%, to ¥585 billion ($4.0 billion). Net earnings rose over 60% to ¥61.4 billion ($424.1 million) in 1990.

Canon expects its total sales revenues for 1991 to increase approximately 10%, a figure which Baring Securities believes to be slightly optimistic, considering the speed and depth of the anticipated recovery in export markets.—*Marsha W. Johnston*

NTT Data Communications Systems Corp.

17 Mori Building
26-5 Toranomon, 1-chome
Minato-ku, Tokyo 105, Japan
(81-3)-3509-4647

RANK **7**
IS REVENUE **$2.38 B**

Systems integration and facilities management giant NTT Data Communications Systems Corp., has not been immune to the ailments of the Japanese financial markets.

For many years, banks and financial services firms have been the largest information technology investors in Japan. But the financial market is feeling the effects of higher interest rates and tighter profit margins; thus, demand for new IT investments is weakening.

This has inevitably hurt NTT Data. The company's customers include all of Japan's leading banks and financial institutions; indeed, NTT Data earns 50% of its income from the financial market. Sales in fiscal year 1990, ending March 31, 1991, increased 12.7% to a record high of ¥345 billion ($2.4 billion). But net earnings declined by 13% to ¥12.7 billion ($87.7 million). Results were negatively affected by high depreciation, high interest rates and, according to the company, heavy use of subcontractors.

NTT Data, a wholly owned subsidiary of Nippon Telegraph and Telephone Corp. (NTT), has designed and delivered on-line fund transfers for 4,800 banks and financial institutions and their 44,000 offices throughout Japan. The company also developed and installed Japan's largest on-line system for nationwide postal banking services. The system links more than 24,000 post offices nationwide.

In 1990, NTT Data took its first cautious steps toward establishing international status. Initially, it intends to support Japanese financial sector customers doing business abroad. Last year, it established offices in London and New York City, but revenue from these operations have so far been modest. One big win: the New York office signed a contract to design a network for Wall Street's Dai-ichi Kangyo Bank.

Despite the current difficult business climate, NTT Data forecasts that its sales will increase faster this year than last, by 16% to about ¥400 billion. The company says growth will be fueled by markets for systems integration and facilities management, which are expected to continue growing 10 to 15% annually.—*Weje Sandén*

Ricoh Co. Ltd.

15-5, Manami-Aoyama 1-chome
Minato-ku, Tokyo, Japan
(81-3)-479-3111

RANK **8**
IS REVENUE **$2.33 B**

Ricoh Co. Ltd.'s strategy of integrating data and image processing continued to pay off in 1990. Strong peripheral and PC sales helped Ricoh's IS revenue rise 31% to ¥337.6 billion ($2.33 billion) as of the fiscal year ending March 1991. But, despite healthy revenue, earnings fell 14.6% to ¥13.6 billion ($93.6 million). The company attributes the drop to the intense competition in the facsimile machine market, which squeezed profit margins; the rise in the yen's value in 1990; sizable research and development investments; and the cost of setting up new manufacturing facilities overseas.

Successful products introduced last year include the Refile 21R rewritable optical filing system, a bundled hardware and software product designed to replace conventional office filing systems. Ricoh's Image 420 series of digital copiers, including a full-color model, was also well received. The company plans to introduce a new generation of low-end laser printers this fall.

Digital technology is crucial to the company's strategy of linking data and image processing. "The key word at Ricoh is *multimedia*," says Kunihito Minakawa, manager of Ricoh's finance department. Ricoh remains weak in the systems integration field, however, and analysts say the company will have to emphasize SI to complement its acknowledged expertise in multimedia.

Ricoh, which has been selling IBM PCs on an original equipment manufacturer (OEM) basis since 1987, strengthened its ties with IBM in April 1990, when it formed a 50-50 joint venture called RIOS. The venture, based in Kanagawa prefecture near Tokyo, is developing interfaces between Ricoh office automation and image-processing products and IBM computers. It is also conducting research into joint hardware development. In April 1991, the company struck an agreement to supply IBM with Ricoh's 32-bit PS5223-S notebook computer, which IBM will sell on an OEM basis. IBM already sells a 16-bit notebook from Ricoh.—*Steve McClure*

Nihon Unisys Ltd.

17-51, Akasaka 2-chome
Minato-ku
Tokyo 107 Japan
(81-3)-3585-4111

RANK **9**
IS REVENUE **$2.24 B**

Nihon Unisys Ltd. stayed tough this last year. Its largest shareholder, Unisys Corp., tried to sell its 34% stake in Nihon Unisys, and the mainframe computer business in Japan grew at its slowest pace ever. Still, Nihon Unisys managed to hold onto its share of the Japanese mainframe, PC and software markets. Maintaining market share and growth had its price, however, as the company's dismal earnings were far lower than expected.

Despite revenue growing a reasonable 13.5% to ¥324.6 billion ($2.24 billion), net earnings dropped a whopping 57% to just ¥2 billion ($13.9 million). Heavy competition and razor thin margins on hardware in the Japanese market accounted for much of the

earnings loss. Nihon Unisys reacted to the lower margins by cutting its work force by 8%, a move that most likely kept the company out of the red.

Yamaichi Securities is one company that is confident in Nihon Unisys's staying power. The firm was among the first to purchase the computer maker's newest and most powerful mainframe, the Unisys 2200/900. This machine, imported from Unisys in the United States, can be linked up to three other 2200/900s, each with a maximum of eight processors. An equally powerful mainframe, the A19, was also announced this year and will be delivered at the end of 1991.

Nihon Unisys continues to resell on an original equipment manufacturer (OEM) basis most of its hardware from Unisys and other manufacturers and is really beginning to feel the financial pinch of this strategy. The PCs and laptops that Nihon Unisys continues to OEM from Toshiba Corp., for example, help fill out the company's product line but don't add much to the bottom line. To counter this trend, Nihon Unisys has focused much of its efforts on value-added services and software. This year, software made up 24% of all revenue.

To strengthen its position in the important software niche that Nihon Unisys has carved out for itself in Japan, the company embarked on a major joint venture with auto giant Toyota Motor Corp. The two companies have formed a separate software company called Toyota Soft Engineering; Toyota owns 65%, and Nihon Unisys owns 35%. The move is expected to strengthen Nihon Unisys's expertise in computer-aided design and manufacturing (CAD/CAM) software, a rapidly growing niche in the Japanese software market.—*Tom Wood*

OKI Electric Industry Co. Ltd.

7-12 Toranomon 1-chome
Minato-ku, Tokyo 105, Japan
(81-3)-3501-3111

RANK **10**
IS REVENUE **$2.09 B**

Sales of high-speed automatic teller machines and other data-processing equipment to banks account for 40% of Oki Electric Industry Co. Ltd.'s business—a statistic that didn't help Oki much last year. When Japanese banks began to feel the economic pinch in 1990 due to factors such as the declining Japanese real estate market and lower customer savings rate, Oki's growth slowed.

Total corporate sales rose just 5% to ¥660.9 billion ($4.56 billion), while profits slid 39% to ¥9.9 billion ($68.1 million). DATAMATION estimates Oki's IS revenue at over ¥300 billion ($2.09 billion).

Oki's focus on the financial world hasn't prevented it from expanding its IS activities in other areas. The company recently introduced its Oki Station 7300 workstation. Designed primarily for engineering applications, the 32-bit machine is Oki's first major attempt to offer a UNIX-based computer. "We're expecting a lot from this product," says Touru Mori, general manager of the general planning office in Oki's information systems group.

The company is also designing local area networks for clients in the financial services industry, as the idea of downsizing catches on among Japanese companies. Also to that end, Oki launched the AX Note 386A, a 32-bit laptop, in August 1990, aiming it at the business market.

One problem Oki faces is developing software for its computers. Like other Japanese companies, Oki uses a network of subcontractors to design software, but Mori says it's difficult for the subcontractors to keep up with demand.

Sales of printers in the year ending March 1991 were good. Oki, long known for its dot matrix printers, is now setting its sights on the laser printer market. The company established a printer factory in Britain in 1988, and in August 1991 the Japanese company was to have completed a deal to buy Technitron PLC, a British printer sales company. That deal was intended to solidify Oki's position in the European market ahead of the European Community market integration, set to occur at the end of 1992.—*Steve McClure*

Mitsubishi Electric Corp.

2-3 Marunouchi, 2-chome
Chiyoda-ku, Tokyo 100
(81-3)-218-2111

RANK **11**
IS REVENUE **$1.83 B**

This spring, Mitsubishi Electric Corp. moved into the second phase in the expansion of its information and communications system division, which it established four years ago. Now the division will provide business solutions that run on standards-based systems in open architectures. Mitsubishi plans to strengthen its research and development efforts in this area and is forming partnerships with other suppliers to bring business applications and open systems to market.

Although Mitsubishi says that sales for the division have increased by 14% every year, the group has failed to gain significant market share. The group's other spring announcements seem to indicate that Mitsubishi has recognized the division's weaknesses in developing hardware and software and has decided to become essentially a value-added remarketer of other vendors' equipment.

The most striking evidence of this is an original equipment manufacturer (OEM) deal Mitsubishi has struck with IBM. Big Blue will supply Mitsubishi with the key technologies of its low-end System 390 mainframes; Mitsubishi will sell those models under its own name in Japan. The Tokyo firm says it expects to sell 900 units over the next three years, at prices ranging from ¥127 million to ¥686 million ($877,000 to $4.7 million). Mitsubishi used to make mainframes, but has a market share in Japan of less than 5%.

The IBM deal and others with Hewlett-Packard Co. and the U.K.'s Apricot Computers Ltd. are sure to help Mitsubishi gain political brownie points for lessening trade tensions by tying up with foreign companies. Mitsubishi has purchased more than 10,000 of HP's HP-UX-based workstations for resale in Japan. It has also licensed the HP-UX source code and HP's Precision Architecture-RISC technology. Mitsubishi is also reselling Apricot's i486-based ST Server, its Qi workstations and its local area network terminal.

Worldwide sales for fiscal 1990, ending in March, were up 11% to ¥3.32 trillion ($22.9 billion). Net earnings were up 4% to ¥79.8 billion ($550.8 million). Information and communications systems revenue totaled ¥265 billion ($1.83 billion), up 16% from last year's figures.—*Marsha W. Johnston*

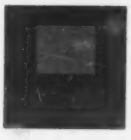
C. Itoh Techno-Science Co.

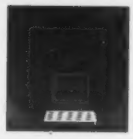
16-7, Komazawa 1-chome
Setagaya-ku, Tokyo 154, Japan
(81-3)-3419-9000

RANK **12**
IS REVENUE **$1.60 B**

Trading company C. Itoh & Co. spun off its office and factory automation divisions in October 1989 to form subsidiary C. Itoh Techno-Science Co. (CTC), a computer reseller. Since then, CTC has begun to carve out a niche for itself as a systems integrator.

Factory automation now plays a decreasing role in CTC's activities, with office automation (OA) the company's primary growth area. In the past, securities companies and banks were the firm's principal OA systems integration customers. But





recently CTC has expanded its customer base to include firms in other industries, including distribution and transportation, for example.

The company designs systems incorporating Sun Microsystems computers, which it sells under the Sun brand name. Spokesman Kanehiko Ishii says that Sun workstations, such as the 32-bit SPARC WS, were a major growth area for the firm last year. He adds that the company, which markets its wares solely in the Asia/Pacific region, is now expanding the range of computers it sells and services. In May, for example, CTC started to market Intel Corp.'s IPSC-860 supercomputer.

"Ninety percent of our sales consist of computers from overseas because we can't compete in selling computers from Japanese manufacturers," says Ishii. "And we concentrate on UNIX-based systems because it's quite advanced and accepted by customers in Japan, since it's convenient to switch to UNIX systems from NEC-based ones."

Given the increasing competition in the hardware field, the firm ultimately hopes to switch its emphasis to software development. Presently, CTC develops some software in house but for the most part relies on suppliers in the United States. —*Steve McClure*

Seiko Epson Corp.

3-5 Owa 3-chome
Suwa-shi, Nagano-ken 392, Japan
(81-26)-652-3131

RANK **13**
IS REVENUE **$1.59 B**

Continuing its battle with NEC Corp. and Toshiba Corp. for supremacy in the notebook and laptop computer sector, Seiko Epson Corp. introduced four new models of its Note PC and a new color laptop in 1990.

The new notebooks include two 80286-based units—PC-286 Note F and PC-286C—and two 386SX models—PC-386 Note A and PC-386 Book L. In a nod to the commercial failure of its first Note computer, the Note F and Note A are equipped with both integrated circuit card slots and floppy drives. The first Note, which operated exclusively on IC cards when it was introduced in the summer of 1989, lost out in the market to Toshiba's heavier, but standard disk drive-equipped, Dynabook.

The color laptop that Seiko Epson alluded to in last year's DATAMATION 100 did indeed arrive at midyear, as promised. The 32-bit PC-386LSC's metal insulator metal diode color liquid crystal screen, which Seiko Epson developed, can display 16 colors simultaneously from a palette of 4,096 colors. The company says the display has a resolution comparable to traditional CRTs.

Seiko Epson is a private company and does not release its financial results. DATAMATION estimates its IS revenues increased almost 10% to $1.59 billion. Sixty percent of IS revenues came from peripherals, and the rest came from personal computers, the company says.—*Marsha W. Johnston*

Acer Inc.

602 Min Sheng East Road
Taipei 10445, Taiwan
(886-2)-718-2349

RANK **14**
IS REVENUE **$751.0 M**

Last year, Acer Inc. conceded that its subsidiary Counterpoint, a U.S. multiuser computer systems maker, had failed to live up to its intended role—providing Acer with a UNIX platform and support for the company's U.S. marketing and service operation. As a result, Acer acquired another U.S. computer firm with a UNIX heritage—Altos Computer Systems. All this prompted a major restructuring last September, including the merger of Counterpoint into Acer America Corp.

The move helped pump up Acer's revenues to $949 million, in line with its historical 30 to 40% growth levels. But profits sank 59% to $2.4 million, due in part to costs associated with the acquisition.

However, president Leonard Liu dismisses the poor earnings by saying that Acer is not trying to turn a quick profit. "Stan Shih [chairman and chief executive officer] and his management team want to build a microcomputer company that is going to be around," he says.

Still, acquisitions aside, some of Acer's financial woes can be traced to shortcomings at Acer itself. New product development slowed in 1990. And, although the company says it has been working on long-term projects, outsiders observe that Acer's senior management has been overly immersed in joint venture activities and management problems outside Taiwan.

Liu cites Acer's strategic strengths in a number of areas as key to the company's future. These strengths include a full line of PC products, the production of memory chips through a joint venture with Texas Instruments Inc. and in-house design and production of application-specific chips through an alliance with National Semiconductor Corp. A line of color monitors and Acer's production of its own Basic Input/Output System (BIOS) chips round out the company's strengths.

Alarmed by the paucity of its new product introductions last year, Acer has been introducing a flood of items in 1991, including a 386SX notebook computer and the first 486SX with the CPU on a single chip. But the biggest lessons that Acer's management has learned are that sales don't automatically grow, and big problems take time to solve.

—*Lewis H. Young*

Nomura Research Institute Ltd.

134 Gohdo-cho
Hodogaya, Yokohama 240, Japan
(81-45)-333-8100

RANK **15**
IS REVENUE **$652.3 M**

The Nomura Research Institute Ltd. (NRI) is another company whose rapid growth over the past few years has been fueled by the increasing importance of systems integration in Japan. NRI is part of the group of companies controlled by stockbroker giant Nomura Securities. Forty percent of NRI's business is consulting and SI work done for its parent company.

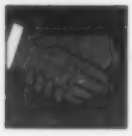
NRI's sales increased 27% to ¥139.5 billion ($963.5 million) in the fiscal year ending March 1991, but net earnings dropped almost 18% to ¥7.5 billion ($51.6 million). IS revenue rose only a marginal 1% to ¥94.5 billion ($652.3 million) due to debt burdens, construction of NRI's new headquarters in Yokohama and a new office in Osaka.

Within the last year, NRI has opened offices in Frankfurt, Paris and Zurich, bringing to nine the number of bases the firm has overseas. NRI's customers outside Japan are either Nomura Group companies or other Japanese firms requiring SI expertise.

Inside Japan, NRI's customers—apart from Nomura group firms—have been companies in the distribution field, such as 7-Eleven Japan, for which NRI helped set up an on-line inventory-accounting system featuring Tandem Computers Inc.'s fault-tolerant hardware. "Recently, we've also been aiming at manufacturers and government offices," says Tokoyuki Hotta of NRI's planning department.

In finance, the core of NRI's business, the company is placing more emphasis on workstations featuring software that helps clients design new types of financial instruments and run simulations. Analysts point out that NRI is well qualified to offer this service, since parent Nomura Securities makes wide use of workstations in its operations.

—*Steve McClure*



TATUNG CO.

22 CHUNGSHAN NORTH ROAD, 3RD SEC.,
TAIPEI, TAIWAN, 10451
(886-2)-592-5252

RANK **16**
IS REVENUE **$593.4 M**

Taiwanese conglomerate Tatung Co., which makes everything from electric fans to power generators, shipped its first PC in 1981. Since then, the company's IS business has grown rapidly, mainly by supplying computer monitors to original equipment manufacturer (OEM) customers like IBM.

The appreciation of the New Taiwan dollar in the recent years, along with heavy international competition, has drastically squeezed the profit margin of Taiwan's electronics industry. As a result, Tatung, which exports more than 70% of its products, realized flat corporate revenues of NT$50 billion ($1.88 billion) in 1990. Worldwide PC price wars contributed to Tatung's flat sales.

In addition to making monitors, PCs and laptop computers, Tatung has been trying to revive the company's growth by introducing high-end workstations. At last year's Siggraph show, Tatung rolled out its Mariner 4i SPARC-based workstation; later, at COMDEX/Fall 1990, it introduced another SPARC workstation, the TWS-5020.

Tatung expects to ship 10,000 SPARC workstations in 1991, ranging in price from $7,000 to $11,000. Distribution plans will focus on export sales primarily to North America and Europe, although it plans to appoint distributors in Japan, as well.

—Hugo X. Hsiung

CSK CORP.

SHINJUKU SUMITOMO BUILDING
6-1 NISHI-SHINJUKU 2-CHOME
SHINJUKU-KU, TOKYO 163, JAPAN
(81-3)-334-1811

RANK **17**
IS REVENUE **$527.2 M**

CSK Corp., a subsidiary of conglomerate CSK Group, is one of Japan's largest independent computer services firms. It made its international breakthrough in 1990 when it acquired Micrognosis Inc., of Danbury, Conn., from Control Data Corp. Micrognosis, which supplies integrated trading room systems to the international financial services community, has 425 employees and operates in 15 nations in North America and Europe. In addition, CSK acquired an equity stake in Wavefront Technologies Inc., a California-based company that develops and markets three-dimensional graphics and animation software.

As of January 1, 1991, CSK established a new subsidiary, CSK International Corp., which is assigned to expand CSK Corp.'s overseas operations. The subsidiary will also provide support to Micrognosis.

Last year, in order to expand CSK's market presence in Japan, the company started to establish regional computer services franchises. In 1990, the company started seven franchises; it intends to have 50 by the end of the decade. The franchises will develop software, provide maintenance and sell computers and supplies.

CSI Corp. Ltd., a joint venture with IBM Japan Inc. founded in September 1989, assumed CSK's small and medium-sized computer sales business; CSI's sales are not consolidated into CSK Corp.'s revenues.

In fiscal year 1990 (ending September 20), CSK Corp.'s total sales grew 11.8% to ¥80.2 billion ($553.9 million); net earnings increased 12% to ¥4.8 billion ($32.8 million). Revenue from computer software climbed a substantial 22% to ¥62.3 billion ($430.5 million), but hardware sales were down almost 16% to ¥14 billion ($96.7 million).

—Weje Sandén

SONY CORP.

7-35, KITASHINAGAWA 6-CHOME
SHINAGAWA-KU, TOKYO 141 JAPAN
(81-3)-3448-2111

RANK **18**
IS REVENUE **$499.5 M**

To many people, Sony Corp. is synonymous with Walkmans, but a growing number of IS users have become familiar with the company's workstations, PCs, graphics terminals and storage devices. Sony's computer products often demonstrate the same penchant for innovation that has characterized Sony's consumer electronics offerings.

Still, only a very small portion of Sony's overall revenues, which totaled ¥3.6 trillion ($25 billion) in fiscal year 1990 (ending March 31, 1991), up 25.6% from the previous year, come from information systems products. Televisions, video and audio equipment accounted for 65% of Sony's 1990 revenues; music and filmed entertainment made up 20%. Industry observers and DATAMATION estimate that Sony derives about 2% (¥72.3 billion or $499.5 million) of its total revenue from IS products.

Corporate operating income remained flat at ¥297 billion ($2.05 billion) in FY90, but net earnings rose 13.7% to ¥117 million ($808 million).

One of Sony's most successful IS thrusts has been in the optical storage marketplace. By the end of 1990, Sony held 64% of the worldwide installed base of 5¼-inch rewritable optical media and drives, says Kathryn Hilton, an analyst at Infocorp., a Santa Clara market research firm.

Sony joined with Hewlett-Packard Co. to develop digital data storage (DDS) technology. By December of this year, Sony plans to begin volume shipments of a 3½-inch, 4-millimeter DDS tape drive that will store up to 4 gigabytes of data.

The IS product that has gained Sony the most attention recently is its Networked Engineering Workstation (NEWS) 3250, a 17.7-pound portable UNIX workstation based on the R3000 reduced instruction set computing (RISC) processor from Mips Computer Systems Inc.—*Dwight B. Davis*

KYOCERA CORP.

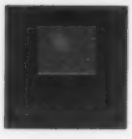
5-22 KITAINOUE-CHO HIGASHINO
YAMASHINA-KU, KYOTO 607, JAPAN
(81-75)-592-3851

RANK **19**
IS REVENUE **$480.0 M**

Kyocera Corp. felt the effects of poor laser printer sales last year, especially in Europe. Laser printers account for 55% of Kyocera's IS sales, and consequently revenues increased only 4% in fiscal 1990, to ¥69.5 billion ($480 million), while corporate revenues increased almost 10% to $3.2 billion. The Kyoto-based company's net corporate earnings fell 5% to ¥32.3 billion ($222.7 million).

Along with ailing printer sales, Kyocera blames the depressed European economy and intense competition from manufacturers such as printer giant Hewlett-Packard Co. for the less than spectacular results. The rise in the value of the yen in the second half of the year also had a negative effect on Kyocera, which exports 41% of its products. Additionally, the company paid ¥5 billion ($34.5 million) in settlement of an environmental lawsuit against AVX Corp., a U.S. electronics parts maker, which Kyocera acquired in 1989. AVX lost that lawsuit before the acquisition.

Kyocera is one of the world's largest manufacturers of integrated circuit (IC) packages, and the IC realm is the company's primary business. However, last year the firm increased its IS profile. It introduced a 32-bit Intel Corp. processor-based PC called the Multilight, which is designed for office use. The Multilight is the first PC that Kyocera has manufactured; previously, it resold PCs on an original equipment manufacturer



(OEM) basis. So far, sales in Europe, one of the company's most important IS markets, have been poor. Kyocera also began manufacturing 16-bit laptops on an OEM basis last year for another firm, whose name Kyocera declines to reveal.

This March, Kyocera introduced a lightweight (1.3 pound) pocket computer in Japan called the Refalo. The company has high hopes for the product, but it's still too early to tell whether that optimism is well placed. Kyocera plans to make Refalo available in Europe and North America during this fiscal year.

The firm also sold $6 billion worth of hard disk drives last year, but profits were low because of tough competition, which led to price cutting. A bright spot for Kyocera was liquid crystal display (LCD) manufacturing. The company sold $5 billion worth of LCDs in 1990 and expects sales to increase 20% this year.

Kyocera typically increases research and development spending by 20 to 25% a year, and 1990 was no exception. R&D rose 21% to ¥22.7 billion ($156.5 million). Most of that went toward research into ceramic materials, as well as to R&D of telecommunications and office automation equipment.—*Steve McClure*

Mitac International Corp.

585 Ming Sheng East Road
Taipei, Taiwan
(886-2)-501-8231

RANK **20**
IS REVENUE **$450.0 M**

Mitac International Corp., fared well in 1990 because the company focused on making money, not just sales when the worldwide computer economy turned soft.

"We tried to keep the profit target, not the sales target," chairman Matthew Miau says. Those sales, which the company reports in dollars, grew 18% to $450 million—way off its original target of 32% or $505 million. But the company did manage to preserve profits, which, at $23.2 million remained level with 1990's performance.

In late 1990, Miau reorganized the company, establishing five regional headquarters for strategic business units and revamping its accounting systems. Among his motives was a desire to address the company's new businesses—notably PC monitors, motherboards and portable computers. Last year, the company generated 51% of its revenues from personal computers and another 33% from peripherals.

The multiple headquarters concept reflects the different strategies Mitac has developed for each part of the world. Last year, the firm generated 19% of its revenues in North America, 43% in Europe, 30% in Asia and 8% in other regions. In the United States, the company sells mainly to original equipment manufacturers (OEMs), instead of trying to build a brand name identity. In Europe, Mitac sells machines bearing its name. In third-world countries, where price is paramount, Mitac sells motherboards and licenses its technology to other manufacturers.

New products and new businesses are expected to put Mitac back on the fast growth path in 1991. This projection is fueled partially by the $NT475 million ($17.8 million) the company spent on research and development in 1990. Mitac's new products include the 428OG Extended Industry Standard Architecture (EISA) 486 system and a new line of high-performance, small footprint Apache workstations. The company also has started production of the first Taiwanese PC monitor that meets the Scandinavian countries' low radiation standards, said to be the toughest in the world.

All this activity should lead Mitac toward 40% growth in 1991.—*Lewis H. Young*

Intec Inc.

2-11 Okudamachi, Toyama
Toyama Prefecture 930, Japan
(81-764)-32-5511

RANK **21**
IS REVENUE **$402.7 M**

Intec Inc.'s expertise in software development and value-added networks (VANs) helped the company achieve a solid 18% rise in corporate revenue to ¥58.3 billion ($402.7 million) in the fiscal year ending March 1991. Corporate profits rose 10% to ¥2.4 billion ($16.5 million). Over the next three years, Intec hopes to double its total annual sales to reach ¥100 billion.

The company's goal is to balance all four of its major business areas—data processing, software development, information systems and data communications operations—so that each sector accounts for 25% of its business. The company will have to push data communications hard in order to achieve this goal, as now it lags behind other operations with only 13% of the business. At present, software development outweighs the others, pulling in almost 39% of Intec's revenue. Data processing accounts for 20% and information systems almost 28%.

"In the past few years, the company has put a lot of energy into the VAN field," says a company spokesperson, who also points out that in 1982 Intec became the first Japanese company to offer VAN services. Starting this October, Intec will offer Integrated Service Digital Network (ISDN) services, becoming only the second Japanese firm after Nippon Telegraph and Telephone Corp. (NTT) to do so.

Intec made two major agreements with overseas firms this past fiscal year. In December, the firm signed a technical cooperation contract with Canada's Northern Telecom Ltd. The agreement involves an exchange of Intec's networking know-how for Northern Telecom's technical expertise in switching technology.

In February, Sprint International bought the licensing rights to Intec's facsimile service switching software, in order to start a value-added fax service this summer. Intec has marketed Sprint's communications systems in Japan since 1982.

In August 1990, the company completed work on a new ¥8 billion ($55 million) regional headquarters in Yokohama, just outside Tokyo. The facility gives Intec a much more visible location from which to operate, since Toyama, its headquarters, is far from the center of Japan.—*Steve McClure*

Goldstar Co. Ltd.

20, Yoido-dong
Youngdungpo-gu,
Seoul 150-721, Korea
(82-2)-787-1114

RANK **22**
IS REVENUE **$391.0 M**

In 1990, Goldstar Co. Ltd. reaped rewards from painful lessons it learned in 1989. That year, Goldstar Co. Ltd.'s star fell, as the $4 billion subsidiary of $25 billion Lucky Goldstar Group faced rising interest rates, won and wages. The maker of home appliances, audio and video equipment, televisions and information systems products, Goldstar Co. felt the pinch—1989 profits remained flat against sales that fell 7.8%. Labor strikes caused an estimated $600 million loss in production.

But Goldstar's 1989 trouble might have been the best thing that could have happened to it. To combat its problems, the company, family-run since the Koos founded Lucky Goldstar in 1947, implemented a tough strategy that called for change on several fronts.

First, the ruling family loosened the reins and allowed professional managers to make more decisions. (It did so in part by appointing a new president and chief executive officer, Hun-Jo Lee, in 1990.) That strategy, in turn, helped Goldstar drastically improve product quality, so that the company could use quality rather than price to compete in the

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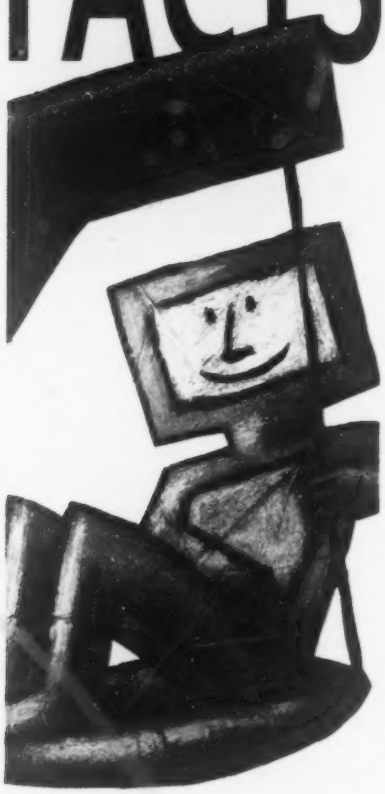

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global market. This was critical since, due to the rising won, Korean-manufactured goods cost as much as Japanese products, but aren't considered to be as technically advanced.

In fiscal 1990 (ending December 31, 1990), Goldstar successfully carried out much of the plan it conceived in 1989. With the help of healthy sales to Germany and Eastern Europe, revenue climbed 14.6% to W2.98 trillion ($4.22 billion). Profits shot up: earnings hit a celestial 86.6% growth rate, soaring to W33.7 billion. ($47.5 million).

DATAMATION estimates that less than 10% ($391 million) of Goldstar's business is in IS, including PCs, workstations, midrange systems, monitors and printers. Last year, it introduced a 12.5-million-instruction-per-second workstation based on the Scalable Processor Architecture (SPARC). It also brought out an 80486-based server and a 386SX laptop. In the works are an 80MIPS SPARC clone and color laser printers.

In May 1991, Lucky-Goldstar completed a notable $15 million purchase of a 5% stake in Zenith Electronics Corp., the $1.4 billion Glenview, Ill., television manufacturer. The deal allows Goldstar to use Zenith's flat-screen television technology, called Flat Tension Mask, in its TVs and monitors. In turn, Goldstar provides its considerable global marketing and distribution resources to loss-making Zenith. —*Elaine L. Appleton*

Alps Electric Co. Ltd.

1-7, Yukigaya-otsuka-cho,
Ota-ku, Tokyo 145, Japan
(81-3)-726-1211

RANK 23
IS REVENUE $384.1 M

What a difference a year makes. In fiscal 1989, Alps Electric Co. Ltd.'s net profit was a paltry ¥711 million ($5.15 million) due to the severe effect the then-rising dollar and subsequent higher domestic operating costs had on the company's overseas subsidiaries. But in its last fiscal year, which ended in March 1991, the firm's profits skyrocketed more than 11-fold to ¥8.2 billion ($57 million) on the strength of solid sales of electronic components used in telecommunications, car-audio and satellite broadcast systems. Total revenue at ¥462 billion, ($3.26 billion) was up 14.7% over 1989's level.

Alps's IS revenue was less profitable than the other divisions in FY90, as price competition among peripherals makers remained strong. The company, one of the world's largest independent suppliers of floppy disk drives, is aware of the need to boost its sales of both printers and disk drives. Sales of both types of products together rose only 1% to ¥55.6 billion ($384.1 million) in FY90.

"Alps is a latecomer when it comes to value-added products like hard- and floppy-disk drives," says Junichi Saeki, research manager of Dataquest Japan's information systems group. "But I think they have the confidence to survive in a tough market, and they have a strong potential for growth, as end-users become more aware of their name."

Alps's overseas operations produce 30% of the company's revenues. Revenue from its Singapore subsidiary surged 33% ahead of last year's, largely due to strong sales of IS-related products in European markets. The firm's Taiwanese operation, however, recorded a profit decline due to stiff competition from Taiwanese IT suppliers.

Alps expects its IS earnings picture to improve in the next 12 months as it cuts costs, particularly in its overseas operations. It projects further growth in the satellite-broadcast related field, as well as in liquid crystal displays (LCDs), an area in which it is placing great hopes.—*Steve McClure*

Omron Corp.

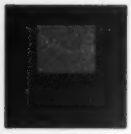
Karasuma Nanajo,
Shimogyo-ku,
Kyoto 600 Japan
(81-75)-344-7000

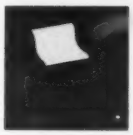
RANK 24
IS REVENUE $291.3 M

The highlight of Omron Corp.'s 1990 fiscal year, which ended March 31, 1991, was its March 12 acquisition of Nippon Data General (a subsidiary of Westborough, Mass.-based Data General Corp.) for ¥6.5 billion ($44.9 million). The acquisition boosted Omron's corporate assets by 23% but won't add revenue to the bottom line until next year. In fiscal 1990, total corporate revenue jumped 11.6% to ¥464.4 billion ($3.21 billion), but earnings grew only 3.2% to ¥21.5 billion ($148.3 million), the same slow but steady growth rate as the previous year.

The ambitious Data General deal capped off a fiscal year that began with the announcement of a three-year intensive investment plan. According to Omron senior general manager Akio Imaizumi, the plan is designed to promote growth in many areas, including adding new North American sales offices and extending Omron's North American network of office automation dealers and distributors.

Omron's sales of office automation systems, including workstations, peripherals and photocopier components, increased





15% during fiscal year 1990. A full 95% of its office automation business comes from sales outside Japan. Of Omron's four other major product groups—control components and systems, electronic funds transfer (EFT) systems, traffic control systems and health care and medical equipment—the largest share of revenue (61%) comes from its control components and systems group.

In May 1990, Omron added a reduced instruction set computing (RISC) UNIX workstation, the LUNA 88K, to its LUNA workstation line. The product was well received in the United States and was recently adopted as the development support system by Carnegie Mellon University in Pittsburgh. Omron is working with CMU to develop Japanese and Chinese versions of the Mach operating system, which is used in the Open Software Foundation's OSF/1 operating system.

Omron says that its peripherals equipment, including a newly introduced pocket-sized modem, scanners and uninterruptible power supplies, has been selling well despite stiff competition from other Asian companies.—*Laura K. Johnson*

DAEWOO TELECOM LTD.

541 NAMDAEMOON-RO 5, CHONG-KU
C.P.O BOX 6080
SEOUL, KOREA
(82-2)-726-2052

RANK 25
IS REVENUE $200.2 M

Using the copycat strategy for which the Japanese have become famous, Daewoo Telecom Ltd. has learned well how to compete in world markets. However, since 39% of its business is in North America, the company felt last year's economic pinch as much its Asian peers have.

Daewoo's total corporate revenue rose only .3% to W211 billion ($298.1 million) in 1990. IS revenues grew a healthy 8.9% to W141.71 billion ($200.2 million). However, Daewoo invested heavily, adding 21% to its W284.15 billion ($405.9 million) asset base, causing a whopping drop of 49% in net earnings, which came in at a mere W3.40 billion ($4.8 million). A 2.8% drop in employment helped curb earnings losses in 1990.

Daewoo's strategy is heavily weighted toward selling desktop computers; PCs and workstations made up more than 63% of the company's business in 1990. The company become one of the initial supporters of the Advanced Computing Environment (ACE), giving Daewoo Telecom a fair start in the production of next-generation, reduced instruction set computing (RISC)-based desktop workstations.

Leading Edge Products Inc., Daewoo Telecom's Westborough, Mass.-based PC subsidiary (which the company purchased in November 1989), still has yet to become profitable. However, Leading Edge's customer base and distribution channels will be a much-needed help when Daewoo announces its first ACE machines later this year.

Appian Engineering Inc., Daewoo Telecom's San Jose subsidiary, has given the company a small position in the semiconductor market, and Appian's previously declining fortunes have finally begun to rise. Appian has extended its product lines to include microprocessors used in video cards. Expect to see more of Daewoo Telecom's Appian microprocessors in computers, fax machines and telecommunications equipment in 1991.

—*Tom Wood*

THE ASIAN 25

For more information on the DATAMATION Asian 25 companies, circle numbers on Reader Card, above or below.

Fujitsu	570	Seiko Epson	582
NEC	571	Acer	583
Hitachi	572	Nomura	584
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Canon	575	Sony	587
NTT Data	576	Kyocera	588
Ricoh	577	Mitac	589
Nihon Unisys	578	Intec	590
Oki	579	Goldstar	591
Mitsubishi	580	Alps	592
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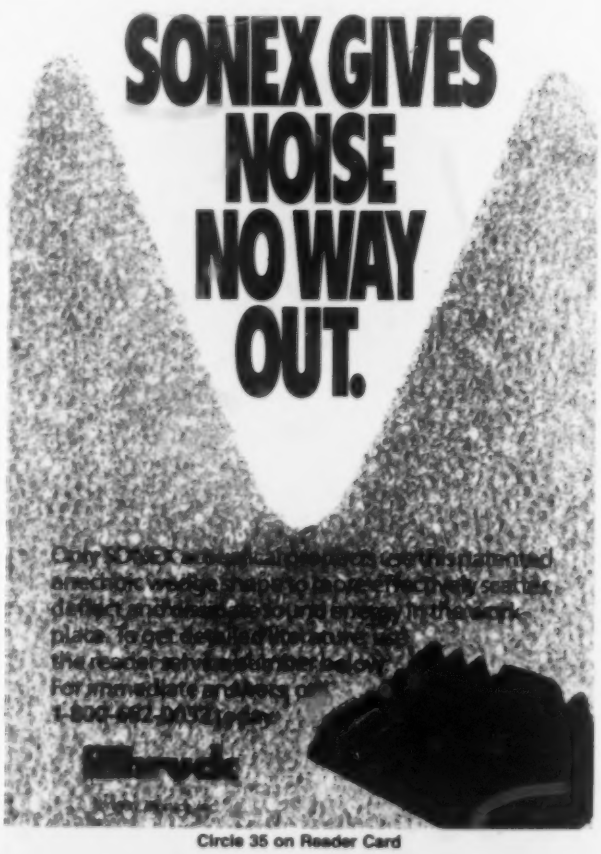


Circle 35 on Reader Card

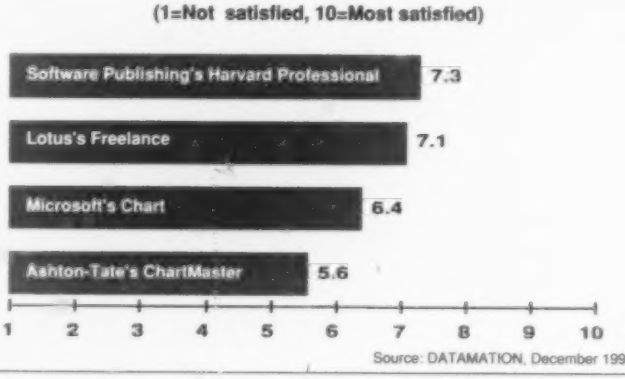
NEW PRODUCTS

A SELECTION OF RECENT INTRODUCTIONS

DATAMATION'S PRODUCT REVIEW

Corporate Satisfaction Scorecard: Graphics

DATAMATION surveyed IS managers who have purchased PC graphics software to determine their level of satisfaction. Owners of Harvard Professional Graphics and Lotus Freelance reported almost equal satisfaction with their purchases. ChartMaster and Microsoft Chart owners, however, are less pleased.



Source: DATAMATION, December 1990

▶ SOFTWARE

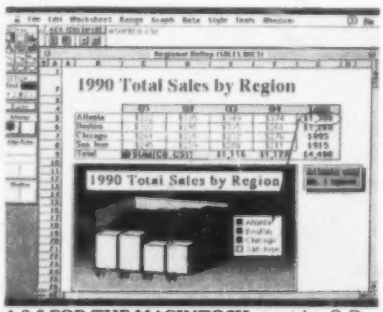
1-2-3 On The Mac

Lotus Development Corp.'s 1-2-3 spreadsheet has jumped to yet another platform: Apple Computer Inc.'s Macintosh. 1-2-3 For The Macintosh provides 3-D worksheet and graphics capabilities; compatibility with Microsoft Corp.'s Excel spreadsheet and other versions of 1-2-3; external data access; and support for Apple's System 7.0. operating system.

Lotus designed 1-2-3 For The Mac as a unified work environment, so all data, graphs and macros reside in the same file. Data and graphs are dynamically linked so any changes made to the worksheet are automatically reflected in graphs. 1-2-3 For The Mac provides formatting, keystroke and macro compatibility with all versions of 1-2-3, and it reads Excel 2.2 and 3.0 worksheet files. The Mac version uses the Classic Menus found in the Windows version of 1-2-3.

The $495 software runs on any Mac from the Mac Plus on up. It requires a hard disk and 2 megabytes of memory when running under System 6.0; 3MB when running under System 7.0. LOTUS DEVELOPMENT CORP., Cambridge, Mass.

Circle 535



1-2-3 FOR THE MACINTOSH provides 3-D worksheet and charting capabilities.

Managing Windows

Symantec Corp. designed The Norton Desktop For Windows for people who find Windows's interface less than intuitive. The new file management and utilities package lets users copy, move, view, launch, delete and print files simply by dragging and dropping icons. For example, to print a file, users just click on a file and drag it to the print icon.

The software also provides automated backup, data recovery and network support, and it includes a collection of Windows-specific tools. The Norton Disk Doctor For Windows repairs mutilated files, unformats disks and retrieves erased files. The SuperFind utility helps users search for text on any drive, including network drives.

The $149 program requires at least a 286-level machine with Windows 3.0, DOS 3.1 or later and 1 megabyte of memory; 2MB is recommended. SYMANTEC CORP., Cupertino, Calif.

Circle 536

Password Security

Password Coach software prevents users from selecting passwords that are easy to guess. The package checks selected passwords against a 140,000-word dictionary; if it finds the word, it forces the user to make a different choice.

The system prevents users from choosing common first and last names, biographical names, geographical places, medical or legal words, technical and scientific terms, acronyms, reversed words, variations of account names and pop culture names, such as Batman. Security managers can expand and customize the dictionary to include organization-specific words.

Password Coach runs on the DEC VAX, the IBM AS/400 and Novell NetWare systems, and can work with any operating system or software that uses passwords, says the vendor. The package sells for $1,400 per server. BASELINE SOFTWARE, Sausalito, Calif.

Circle 537

▶ PCs & WORKSTATIONS

PS/2s For Multimedia

IBM has expanded its line of PS/2 computers with four models, including one model that's suitable for multimedia applications. The models are the 35 SX and LS, 40 SX and 57 SX.

MARKET INSIGHTS

A SURVEY OF TECHNOLOGY TRENDS

You Don't Need ISDN To Link Voice, Data

BY WARREN CHILDS
Business Research Group

Implementation of Integrated Services Digital Network (ISDN) technology continues to rise at a snail's pace—fewer than 10% of DATAMATION's Technology Panel members say they use ISDN today. But a strong interest is building in ISDN among potential users of computer-assisted telephony (CAT). The customer premises-based equivalent to ISDN, CAT can be used to implement integrated voice and data applications on site without requiring ISDN capability.

Of those users who plan to implement CAT voice data applications, some 63% say they also plan to implement ISDN; only 14% say they won't consider doing so. Compare that with the existing base of CAT users. Only 30% of them have already implemented ISDN.

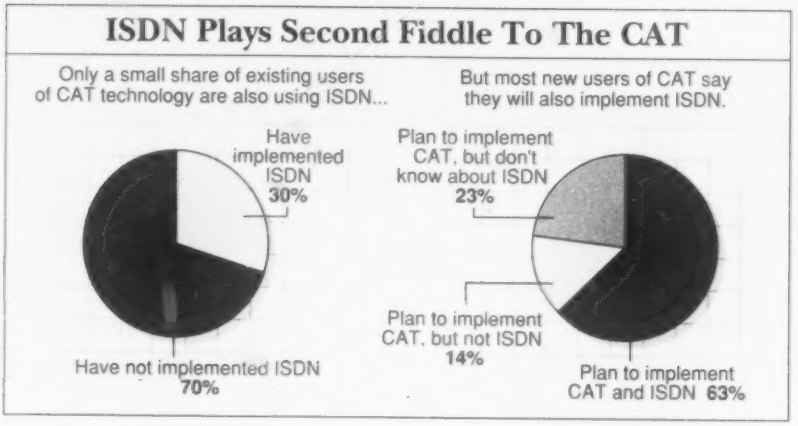
A number of vendors offer products that can link voice and phone number data for incoming calls via a user's private branch exchange (PBX) to computer systems, thereby generating integrated voice and data applications. These products can work in conjunction with ISDN, but they don't require ISDN capability in order to facilitate voice-data applications.

Such integrated CAT voice and data applications are primarily being used to improve operator efficiency in large companies' customer service departments. CAT's ability to simultaneously deliver voice calls and data files to an operator's workstation can reduce the time required for an operator to set up each call, connect with customers and access the data needed to complete the call.

Some 87% of CAT users say they've realized reductions in cost and gains in efficiency that meet their expected payback for implementing the technology; 98% say they are satisfied with their use of CAT. ▭

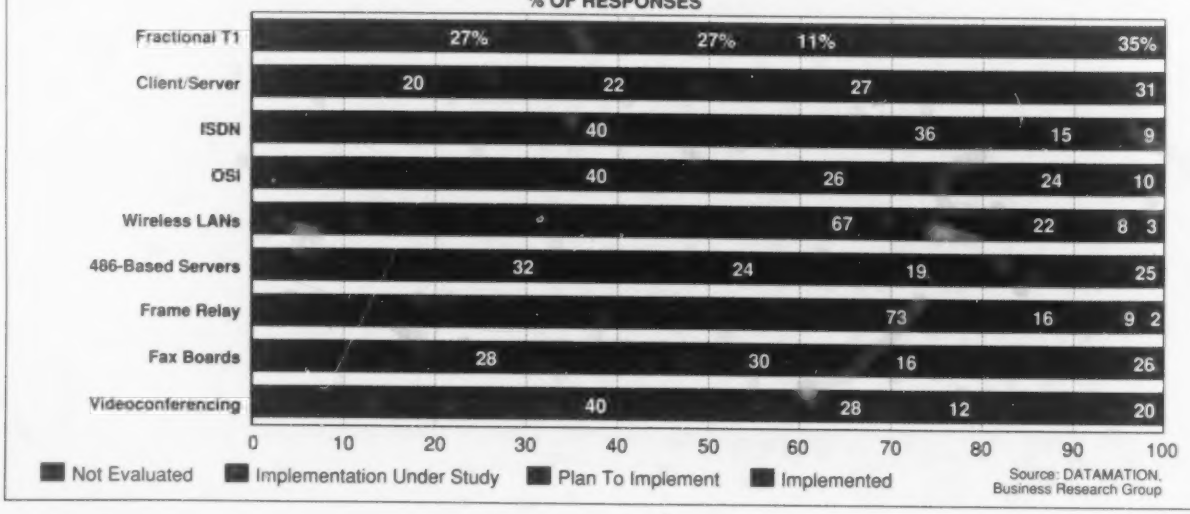
For more information, call Nancy Finn at (617)-964-6204, fax her at (617)-558-4402 or write to her at the Business Research Group, 275 Washington Street, Newton, MA 02158.

ISDN Plays Second Fiddle To The CAT


Only a small share of existing users of CAT technology are also using ISDN...
Have implemented ISDN 30%
Have not implemented ISDN 70%
But most new users of CAT say they will also implement ISDN.
Plan to implement CAT, but don't know about ISDN 23%
Plan to implement CAT, but not ISDN 14%
Plan to implement CAT and ISDN 63%

DATAMATION's Technology Implementation Index: Networks/Communications

DATAMATION each month surveys a select group of its readers--the DATAMATION Technology Panel--to investigate the implementation of new technologies by key user organizations.


% OF RESPONSES
Fractional T1 27% 27% 11% 35%
Client/Server 20 22 27 31
ISDN 40 36 15 9
OSI 40 26 24 10
Wireless LANs 67 22 8 3
486-Based Servers 32 24 19 25
Frame Relay 73 16 9 2
Fax Boards 28 30 16 26
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0 10 20 30 40 50 60 70 80 90 100
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Source: DATAMATION, Business Research Group

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